

## Claims

What is claimed is:

1. A pump carrying supercritical CO<sub>2</sub> fluid or liquid CO<sub>2</sub>,

wherein, a bearing supporting a main shaft has an inner ring, an outer ring and balls thereof formed of a ceramic member, respectively.

2. A pump as described in Claim 1,

wherein, a cage holding the balls is guided by an outer ring, being guided by an inner peripheral surface of the outer ring; or is guided by an inner ring, being guided by an outer peripheral surface of an inner ring; and

wherein, a guide surface of an outer ring or an inner ring is a surface on one side in axial direction.

3. A pump as described in Claim 2,

wherein, the cage is formed of PEEK member.

4. A pump as described in Claim 1,

wherein, ratio of slot radius of inner ring of the bearing is more than 52%.

5. A pump as described in Claim 2,

wherein, ratio of slot radius of inner ring of the bearing is more

than 52%.

6. A pump as described in Claim 3,

wherein, ratio of slot radius of inner ring of the bearing is more than 52%.

7. A pump as described in Claim 1,

wherein, the main shaft is hollow.

8. A pump as described in Claim 2,

wherein, the main shaft is hollow.

9. A pump as described in Claim 3,

wherein, the said main shaft is hollow.

10. A pump as described in Claim 4,

wherein, the main shaft is hollow.

11. A pump as described in Claim 5,

wherein, the main shaft is hollow.

12. A pump as described in Claim 6,

wherein, the main shaft is hollow.

13. A pump as described in Claim 1,

wherein, a cage holding the balls is guided by a rotating ring.

14. A pump as described in Claim 1,

wherein, a cage holding the balls is guided by a fixed ring; and

wherein, a guide surface is formed only on one side to center of the balls in axial direction.

15. A pump as described in Claim 2,

wherein, the cage contains solid lubricant.

16. A pump as described in Claim 3,

wherein the cage contains solid lubricant.